FAR/JAR 25.1328
DIRECTION INDICATOR

(Final Report)
(as agreed in AVHWG meeting#5 in Phoenix on 18 May 2000)
(rev b in meeting #6 in Montreal – 28 June 2000)

1. What is the underlying safety issue addressed by FAR/JAR?

Assures that instruments that display direction information have an accuracy adequate for safe operation of the airplane, considering that the related equipment will have some errors due to conventional installation characteristics or the performance of the equipment itself.

2. What are current FAR and JAR standards?

There is no current FAR paragraph 25.1328. However, FAR paragraph 25.1327 addresses the accuracy requirements for a magnetic direction indicator. However, the type of direction indicator addressed in FAR 25.1327 is not explicitly defined. There is a JAR 25.1327 but it is directed towards the non-stabilized magnetic direction indicator required by JAR 25.1303 (a) (3)

Current FAR 25.1327 Magnetic Direction Indicator:
(a) Each magnetic direction indicator must be installed so that its accuracy is not excessively affected by the airplane's vibration or magnetic fields.
(b) The compensated installation may not have a deviation, in level flight, greater than 10 degrees on any heading.

Current JAR 25.1327 Magnetic Direction Indicator:
(a) Each magnetic direction indicator must be installed so that its accuracy is not excessively affected by the aeroplane's vibration or magnetic fields.
(b) The magnetic direction indicator required by JAR 25.1303 (a) (3) may not have a deviation, after compensation, in normal level flight, greater than 10 degrees on any heading.

Current JAR 25X1328 Direction Indicator:
Direction indicators required by JAR 25.1303(b)(6) must have an accuracy adequate for the safe operation of the aeroplane. (See ACJ 25X1328)

Current ACJ 25X1328

1. After correction the deviation on any heading should not exceed 1°, except that –

a. On aeroplanes with a short cruising range, the above limit may be extended after consultation with the National Authority.

b. A change in deviation due to the current flow in any item of electrical equipment and its associated wiring is permissible, but should not exceed 1°. The combined change for all such equipment, with all combinations of electrical load, should not exceed 2°.

c. A change in deviation due to the movement of any component, (e.g. controls or undercarriage) in normal flight is permissible, but should not exceed 1°.

2. The change in deviation due to the proximity of any item of equipment containing magnetic material should not exceed 1° and the combined change for all such equipment should not exceed 2°.

3. What are the differences in the standards?

FAR 25.1327 does not specify the type of magnetic direction indicators.

JAR 25.1327 specifically addresses non-stabilized magnetic direction indicators, while

JAR 25X1328 addresses stabilized magnetic and non-magnetic direction indicators. The accuracy requirements differ as follows:

> FAR 25.1327 has a 10 degree accuracy requirement for <u>each</u> magnetic indicator, not specific to type, while JAR 25.1327 specifies a 10 degree accuracy requirement for only the non-stabilized magnetic indicator required by JAR 25.1303 (a) 3.
>
> JAR 25X1328 addresses the accuracy requirements for the stabilized magnetic or non-magnetic indicator required by JAR 25.1303 (b) 6.

4. What, if any, are the differences in required means of compliance?

ACJ 25X1328 provides interpretation only for a stabilized magnetic indicator, with a suggested accuracy dependent on magnetic effects.

Compliance with the FAR 25.1327, JAR 25.1327, and JAR 25X1328 becomes confusing because of the differences identified in paragraph 3 of this report.

What is the proposed action?
Consolidate the differences into one harmonized standard FAR/JAR 25.1327.

Incorporate the material from JAR 25X1328 into the harmonized FAR/JAR 25.1327, and provide a new AC with additional wording based on the current ACJ25X1328.

Delete the existing JAR 25X1328 and ACJ25X1328, because they will be enveloped into 25.1327.

Also consider the current TSOs for direction instruments so that the new harmonized installation standard does not conflict with the minimum operational performance standards (MOPS).

5. **What should the harmonized standard be?**

FAR/JAR 25.1327 Direction Indicator

(a) Each magnetic direction indicator must be installed so that its accuracy is not excessively affected by the airplane's vibration or magnetic fields.
(b) The magnetic direction indicator required by FAR/JAR 25.1303 (a) (3) may not have a deviation, after compensation, in normal level flight, greater than 10 degrees on any heading.
(c) Direction indicators required by FAR/JAR 25.1303(b)(6) must have an accuracy adequate for the safe operation of the airplane

7. **How does this proposed standard address the underlying safety issue (identified in #1)?**
The proposed standard provides a requirement for instruments that display direction information, for safe operation of the airplane, considering that the related equipment will have some errors due to the performance of the equipment itself as well as conventional installation characteristics.

8. **Relative to current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?**
The proposed standard may increase the level of safety by clarifying the requirements for the direction indicators required by FAR/JAR 25.1303(a)(3) and 25.1303(b)(6).

9. **Relative to current industry practice, does the proposed standard increase, decrease, or maintains the same level of safety?**
Maintains the same level of safety.

10. **What other options have been considered and why were they not selected?**
The group considered leaving FAR/JAR 25.1327 as-is and incorporating 25X1328 into a new FAR 25.1328, and to have a new AC/ACJ 25.1328. This option was rejected because it would have resulted in two conflicting rules covering the same subject.

The group also considered removing 25.1327 and including all relevant rules into a harmonized FAR/JAR 25.1328. This option was rejected because other regulations and advisory material may reference the existing FAR/JAR 25.1327 (e.g. FAR/JAR 25.1459 for Flight Recorders).

The group also proposed a different harmonized paragraph (c) of FAR/JAR 25.1327, that accounted for the individual errors described in the ACJ25X1328. However, in the spirit of enveloping, this proposed option was rejected.

11. **Who would be affected by the proposed change?**
Nobody, since this is current industry practice.

New JAA certifications will require reference only to JAR 25.1327 instead of both JAR 25.1327 and JAR 25X1328.

12. **To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) need to be included in the rule text or preamble?**
The current ACJ25X.1328 needs to be reviewed and modified as appropriate to write a harmonized AC/ACJ 25.1327.

13. **Is existing FAA advisory material adequate?**
N/A.

14. **If not, what advisory material should be adopted?**
The current ACJ25X.1328 needs to be reviewed and modified as appropriate to write a harmonized AC/ACJ 25.1327.

15. **How does the proposed standard affect the current ICAO standard?**
The AVHWG is not aware of any.

16. **How does the proposed standard affect other HWG's?**
None affected.

17. **What is the cost impact of complying with the proposed standard?**
None anticipated, because current industry practice is already compliant with the proposed standard.

18. **Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?**
Yes.

19. **In light of the information provided in this report, does the HWG consider that the "fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the "Fast Track" process?**
This project is appropriate for the "Fast Track" process.

AC/ACJ 25.1327
DIRECTION INDICATOR

(Final Report)
(as agreed in AVHWG meeting#6 in Montreal on 28 June 2000)

1. What is the underlying safety issue addressed by AC/ACJ?
Assures that instruments identified in FAR/JAR 25.1303(b)(6) have an accuracy which is adequate for safe operation of the airplane, considering that the related equipment will have some errors due to conventional installation characteristics or the performance of the equipment itself.

This corresponds to the proposed harmonized FAR/JAR 25.1327, which has been submitted in conjunction with this report.

2. What are current FAR and JAR standards?
There is no current FAR AC.

Current ACJ 25X1328

1. After correction the deviation on any heading should not exceed 1°, except that –

a. On aeroplanes with a short cruising range, the above limit may be extended after consultation with the National Authority.

b. A change in deviation due to the current flow in any item of electrical equipment and its associated wiring is permissible, but should not exceed 1°. The combined change for all such equipment, with all combinations of electrical load, should not exceed 2°.

c. A change in deviation due to the movement of any component, (e.g. controls or undercarriage) in normal flight is permissible, but should not exceed 1°.

2. The change in deviation due to the proximity of any item of equipment containing magnetic material should not exceed 1° and the combined change for all such equipment should not exceed 2°.

3. What are the differences in the standards?
There is no standard FAA AC 25-1327, while there is a related JAA ACJ 25X1328.

4. What, if any, are the differences in required means of compliance?
ACJ 25X1328 provides interpretation for a stabilized magnetic indicator, with a suggested accuracy dependent on magnetic effects. There is no related FAA AC.

5. What is the proposed action?

Use the existing ACJ25X1328 as a baseline for a harmonized AC/ACJ 25.1327. This corresponds with the proposed harmonized rule (FAR/JAR 25.1327), which essentially eliminates the existing JAR 25X1328. Update the harmonized AC/ACJ to clarify what is necessary for safe operation of an airplane, and to correspond with the minimum operational performance standards (MOPS) of the equipment.

6. What should the harmonized standard be?

AC/ACJ 25.1327

This AC addresses the accuracy of stabilized magnetic heading systems, required for safe operation of the airplane. These systems include means to compensate or correct for errors induced by stable magnetic effects in the airplane. Additional effects due to electromagnetic transients and configuration changes are not normally "compensated" by the magnetic heading system and are also included in this AC.

Should the correction become unavailable (either intentionally or unintentionally), the effects of the resulting heading indication should be considered for safe operation of the airplane. This AC addresses the condition where correction is available and the condition where correction is not available (or failed).

In most circumstances, heading information is not directly used as the primary means of navigation. This condition should permit the applicant to show that the accuracy adequate for the safe operation of the airplane may be different than what is defined in this AC.

1. After correction the cumulative deviation on any heading should not exceed 5°, based on the following:

    a. A change in deviation due to the equipment of the heading system components, the total of which should not exceed 2°.

    b. A change in deviation due to the current flow in any item of electrical equipment and its associated wiring is permissible, but should not exceed 1°. The total cumulative effect for all combinations of equipment, with all combinations of electrical load, should not exceed 2°.

    c. A change in deviation due to the movement of any component, (e.g. controls or undercarriage) in normal flight is permissible, but should not exceed 1°.

2. If correction fails or is not available, the change in deviation due to the proximity of all equipment containing magnetic material should not exceed 2°.

Note: On airplanes with a short cruising range, the above limits may be extended after consultation with the National Authority. For airplanes that do not depend on direction or heading information for navigation (VOR, ILS, FMS, GPS), the above limits may be extended after consultation with the National Authority.

7. **How does this proposed standard address the underlying safety issue (identified in #1)?**
The proposed standard provides a clarification to the basic requirement for certain instruments that display direction information.

8. **Relative to current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?**
The proposed standard may increase the level of safety by clarifying the harmonized requirement (FAR/JAR 25.1327).

9. **Relative to current industry practice, does the proposed standard increase, decrease, or maintains the same level of safety?**
Maintains the same level of safety.

10. **What other options have been considered and why were they not selected?**
The group considered using the ACJ25X1328 as is, but rejected it because it needed some clarification.

11. **Who would be affected by the proposed change?**
Nobody, since this is already considered standard industry practice.

12. **To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) need to be included in the rule text or preamble?**
This is a modification of current advisory material (ACJ25X1328).

13. **Is existing FAA advisory material adequate?**
There is no existing FAA advisory material.

14. **If not, what advisory material should be adopted?**
This is a modification of current advisory material (ACJ25X1328).

15. **How does the proposed standard affect the current ICAO standard?**
The AVHWG is not aware of any.

16. **How does the proposed standard affect other HWG's?**
None affected.

17. **What is the cost impact of complying with the proposed standard?**
None anticipated, because current industry practice is already compliant with the proposed standard.

18. **Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?**
Yes.

19. **In light of the information provided in this report, does the HWG consider that the "fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the "Fast Track" process?**
This project is appropriate for the "Fast Track" process.

ARAC WG Report

TAE

Report from the Flight Test Harmonization Working Group

#8
ANM-00-208-A

Rule Section: FAR/JAR 25.1323(c)

What is the underlying safety issue addressed by the FAR/JAR?: The underlying safety issue is to prevent hazardously misleading airspeed information from being presented to the flightcrew. To this end, FAR/JAR 25.1323 specify the accuracy and calibration requirements and the speed ranges over which each airspeed system must be calibrated. In addition, each airspeed system must be designed and installed so as to minimize the possibility of malfunction by the entry of foreign material, by icing, or due to a collision with a bird.

What are the current FAR and JAR standards?: see below for 25.1323(c), which is the only part of 25.1323 where the standards are different:

Current FAR text: The airspeed error of the installation, excluding the airspeed indicator instrument calibration error, may not exceed three percent or five knots, whichever is greater, throughout the speed range, from--

(1) V_{MO} to 1.3 V_{S1} with flaps retracted; and

(2) 1.3 V_{S0} to V_{FE} with flaps in the landing position.

Current JAR text: (1) The airspeed error of the installation, excluding the airspeed indicator instrument calibration error, may not exceed three percent or five knots, whichever is greater, throughout the speed range, from--

(i) V_{MO} to 1.3 V_{S1} with wing-flaps retracted; and

(ii) 1.3 V_{S0} to V_{FE} with wing-flaps in the landing position.

(2) From 1.3 V_S to stall warning speed the IAS must change perceptibly with CAS and in the same sense, and at speeds below stall warning speed the IAS must not change in an incorrect sense. (See ACJ 25.1323 (c)(2).)

(3) From V_{MO} to V_{MO} + 2/3 (V_{DF} – V_{MO}) the IAS must change perceptibly with CAS and in the same sense, and at higher speeds up to V_{DF} the IAS must not change in an incorrect sense. (See ACJ 25.1323 (c)(3).)

(4) There must be no indication of airspeed which would cause undue difficulty to the pilot during the take-off between the initiation of rotation and the achievement of a steady climbing condition.

What are the differences in the standards and what do these differences result in?: The JAR standard contains requirements, not in the FAR, for speeds greater than and less than the speed range for which accuracy requirements apply. At speeds up to 2/3 (V_{DF} – V_{MO}) and less than the stall warning speed, JAR 25.1323 requires the indicated speed to change

perceptibly and in the same sense as the calibrated airspeed. At speeds up to V_{DF}, the indicated airspeed must not change in an incorrect sense. Also, between the initiation of rotation and the achievement of a steady climbing condition during takeoff, there must not be an airspeed indication that would cause the pilot undue difficulty. An example of such an indication would be a significant pause or change in the rate of change in airspeed. Such effects could be caused by transiting through ground effect.

What, if any, are the differences in the means of compliance?:

The following JAR ACJ's and FAA AC 25-7A material are relevant:

ACJ 25.1323(c)(2): From 1.3 V_S to stall warning speed the rate of change of IAS with CAS should be not less than 0.75.

ACJ 25.1323(c)(3): From V_{MO} + 2/3 (V_{DF} – V_{MO}) the rate of change of IAS with CAS should be not less than 0.5.

ACJ 25.1323(d): The design and installation of the pitot system should be such that positive drainage of moisture is provided, chafing of the tubing and excessive distortion at bends is avoided, and the lag and the possibility of moisture blockage in the tubing should be kept to an acceptable minimum.

ACJ 25.1323(e):

1. Tests should be conducted to the same standard as recommended for turbine engine air intakes (see ACJ 25.1093(b)(1)) unless it can be shown that the items are so designed and located as not to be susceptible to icing conditions. Ice crystal and mixed ice and water cloud will need to be considered where the system is likely to be susceptible to such conditions.
2. However, in conducting these test due regard should be given to the presence of the aeroplane and its effect on the local concentration of the cloud.

AC 25-7A

177. AIRSPEED INDICATING SYSTEM - § 25.1323.

a. Explanation.

(1) Methods. Unless a calibrated reference system is provided, the airspeed system should be calibrated throughout as wide a range as necessary to cover the intended flight tests. The procedures of this section are for the purpose of showing compliance with § 25.1323(b) and are not intended to cover the speed range of the flight tests. If an alternate airspeed indicating system is provided, it should be calibrated. The airspeed indicating system should be calibrated in accordance with the following methods:

(i) The tests should be conducted in stabilized flight at airspeeds throughout the speed range for the airplane configurations to be tested. The airplane's airspeed system should be calibrated against a reference airspeed system or a groundspeed course.

(ii) A reference airspeed system should consist of either of the following:

(A) An airspeed impact pressure and static pressure measurement device (or devices) that are free from error due to airplane angular changes relative to the direction of the free stream or due to slipstream variation resulting from changes in airplane configuration or power. In addition, the device or devices should have a known calibration error when located in the free stream; or

(B) Any other acceptable airspeed calibration method (e.g., the altimeter method of airspeed calibration).

(iii) When establishing the airplane's true airspeed by means of the groundspeed course, flight between the two reference points should be made at constant airspeed in two successive runs in opposite directions to eliminate the effect of wind. The runs should be made only in stable wind. The time to make the runs should be obtained by means of some calibrated device. The speed runs should not be made nearer the ground surface than a wing span's length.

(iv) If an alternate system is provided, it may be calibrated against either the reference system or the airplane's system.

(v) Airspeed Lag. With the advent of electronic instruments in the cockpit, the pneumatic signals from the pitot and static sources are processed and digitized in the Air Data Computer (ADC) and then filtered and transported to the cockpit display. As a result of the data processing and filtering, the associated time lag, and, consequently, airspeed lag at the cockpit display, can be an important consideration in the airspeed indicating system calibration during ground acceleration. As stated in § 25.1323(b), the calibration for an accelerated takeoff ground run must determine the "system error," which is the relation between indicated and calibrated airspeeds. The system error is the sum of the pneumatic lag in the pressure lines, airspeed lag due to time lags in processing the data, and static source, position error.

(A) Airspeed lag must be measured during ground acceleration tests or determined by analysis. Increments should be developed for a range of airplane gross weights considering airspeed lag at V_1 and the associated increase in accelerate-stop and takeoff distances due to lag. The error due to lag in the airspeed indicating system during ground acceleration should not be greater than 3.0 knots throughout the takeoff operating envelope of the airplane. Furthermore, an increase in the takeoff distance or the accelerate-stop distance as a result of airspeed lag should not exceed 100 ft. The 3 knots limitation is intended to establish the maximum acceptable systematic error. Even though

the lag may be within the 3 knots limit, an airspeed correction may be required to stay within the 100 ft. of increased distance.

(B) Corrections may be applied directly in the ADC or they may be introduced via the ground airspeed calibration provided in the Airplane Flight Manual (AFM). If corrections are applied directly in the ADC, it is possible to display calibrated airspeed in the cockpit. Furthermore, if acceleration data are input, the airspeed error can be computed and accounted for in real time, assuming the time lag is known. The alternative would be to use an airspeed lag increment derived from calibration tests that would represent a range of conditions within the takeoff envelope. After correction, an increase in distance due to lag should be less than 100 ft throughout the takeoff envelope, whether applied in the ADC or AFM. Consideration should be given to short field, lighter weight takeoffs (higher acceleration), as well as maximum weight and higher V_1 speeds, in deriving the increment.

(2) Configuration. Airspeed calibration tests should be conducted in the following configurations:

(i) Weight - between maximum takeoff and maximum landing.

(ii) C. G. position - optional.

(iii) Takeoff configuration(s) - ground roll.

(iv) Wing flaps and landing gear - all combinations of positions used to show compliance with the takeoff, climb, and landing requirements of 14 CFR part 25.

(v) Thrust - as required.

b. Procedures.

(1) Any one or any desired combination of the procedures in subparagraphs (2) through (4) of this paragraph may be used for calibrating the airspeed indicating system. The airspeed should be measured or determined simultaneously from the airplane's system and the reference system during stabilized runs for at least five speeds spaced throughout the speed range, the lowest not to exceed 1.3 V_S. The highest speed should not exceed V_{MO}/M_{MO}. The speed spread between the test speeds should be limited to 10 knots from V_S to 1.6 V_S or placard speed, and 20 knots from 1.6 V_S to V_{MO}.

(2) Speed course: The airspeed, power, and altitude should be stabilized before entering the speed course. Constant airspeed should be maintained during each run. The runs should be made in both directions on reciprocal headings for each speed over the speed course. The following data should be recorded:

(i) Time of day at beginning of run.

(ii) Time to make run.

(iii) Pressure altitude.

(iv) Ambient air temperature.

(v) Airspeed at several intervals during run.

(vi) Wing flap position.

(vii) Landing gear position.

(viii) Course distance.

(3) Reference airspeed system: Stabilized runs at the test speeds listed in this paragraph should be made. The airspeed from the airplane's airspeed system and the reference airspeed system should be read simultaneously. The following data should be recorded:

(i) Time of day.

(ii) Airplane's indicated airspeed.

(iii) Reference indicated airspeed.

(iv) Pressure altitude.

(v) Ambient air temperature.

(vi) Wing flap position.

(vii) Landing gear position.

(4) Other acceptable airspeed calibration methods. Stabilized flight runs at the test speeds should be made, and the necessary data recorded, to establish the airplane's airspeed system error and the configuration of the airplane. Calibration methods may also include airspeed boom, static trailing cone, and radar range.

(5) The procedures presented in this paragraph pertain to the calibration of the airspeed indicating system during takeoff ground acceleration. In particular, airplanes with electronic instruments in the cockpit must account for the airspeed lag at the cockpit display associated with data processing and filtering. The airspeed indicating system should not have a lag in excess of 3 knots at the V_1 speed during any takeoff condition. Furthermore, if airspeed lag causes an increase of more than 100 ft. in takeoff or

accelerate-stop distances, a lag correction must be applied to the airspeed indicating system. Airspeed lag should be determined by one of the following methods:

(i) Conduct ground acceleration tests for a range of airplane gross weights to calibrate Indicated Airspeed (IAS) at the cockpit display against the reference Calibrated Airspeed. Determine airspeed lag from the calibration data by comparing the cockpit displayed airspeed with the reference calibration speed for a given gross weight and V_1 speed.

(ii) Determine airspeed lag by analysis using a computer program suitable for AFM development. Compute takeoffs for a range of gross weights to determine the acceleration at V_1. Calculate airspeed lag at V_1 for a corresponding acceleration and a known time lag due to data processing and filtering. The analysis should also consider other sources of airspeed lag as appropriate, such as the pneumatic lag in the pressure lines for the pitot and static sources.

(6) Having established the calibration data, one acceptable method of adjusting for airspeed lag is to apply corrections directly in the ADC data processing to result in a lag-corrected airspeed at the cockpit display. Another would be to include an airspeed lag correction in the takeoff ground speed calibration of Indicated vs. Calibrated Airspeeds in the AFM. A single airspeed lag increment can be developed as the correction for the range of gross weights and corresponding accelerations at V_1. This increment, when applied to the calibration, must result in no more than a 100 ft. increase in takeoff or accelerate-stop distances due to airspeed lag for any takeoff condition. A more accurate correction would result from presenting airspeed lag as a function of airplane acceleration based on the calibration data. If acceleration data are available in the ADC, a real time correction for lag during the takeoff can be applied in the data processing.

What is the proposed action?: Harmonize to the more stringent JAR standard, and add the "requirements" contained in the FAA advisory material.

What should the harmonized standard be?: see below

Proposed text of harmonized standard:

Replace the current FAR/JAR 25.1323(c) with the following, and renumber the remaining paragraphs accordingly:

(c) The airspeed error of the installation, excluding the airspeed indicator instrument calibration error, may not exceed three percent or five knots, whichever is greater, throughout the speed range from--

(1) V_{MO} to 1.3 V_{S1} with flaps retracted; and

(2) 1.3 V_{S0} to V_{FE} with flaps in the landing position.

(d) From 1.3 V_S to the speed at which stall warning begins, the IAS must change perceptibly with CAS and in the same sense, and at speeds below stall warning speed the IAS must not change in an incorrect sense.
(e) From V_{MO} to V_{MO} + 2/3 (V_{DF} – V_{MO}), the IAS must change perceptibly with CAS and in the same sense, and at higher speeds up to V_{DF} the IAS must not change in an incorrect sense.
(f) There must be no indication of airspeed that would cause undue difficulty to the pilot during the takeoff between the initiation of rotation and the achievement of a steady climbing condition.
(g) The effects of airspeed lag may not introduce significant takeoff indicated airspeed bias, or significant errors in takeoff or accelerate-stop distances.

How does this proposed standard address the underlying safety issue?: The proposed standard continues to address the underlying safety issue in the same manner. JAR standards have been added for the purpose of harmonization.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?: The proposed standard increases the level of safety by incorporating the additional JAR requirements. The additional requirement regarding airspeed lag codifies current FAA policy.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?: It maintains the current level of safety since industry practice is to comply with both the FAR and the JAR.

What other options have been considered and why were they not selected?: This item was proposed as an enveloping item. Various options regarding the split between rule and advisory material were discussed to achieve the safety objective while ensuring flexibility in the means of compliance.

Who would be affected by the proposed change?: Manufacturers and operators of transport category airplanes could be affected by the proposed change.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?: The FAA policy regarding airspeed lag has been included in the proposed rule text.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?): Add the following to AC 25-7A:

An acceptable means of compliance when demonstrating a perceptible speed change between 1.3 V_S to stall warning speed is for the rate of change of IAS with CAS to be not less than 0.75.

An acceptable means of compliance when demonstrating a perceptible speed change between V_{MO} to V_{MO} + 2/3 (V_{DF}- V_{MO}) is for the rate of change of IAS with CAS to be not less than 0.50.

The JAA will revise the relevant ACJ's to be consistent with the above text and will add the AC 25-7A text regarding airspeed lag to the JAA Flight Test Guide.

How does the proposed standard compare to the current ICAO standards?: The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?: Yes, this proposal has been coordinated with and approved by the Avionics Systems Harmonization Working Group.

What is the cost impact of complying with the proposed standard?: The Avionics HWG was asked to answer this question. Their response is: "In general the [Avionics HWG] commenters agreed that there will not be any large additional cost (if any) over the present day testing."

Does the working group want to review the draft NPRM prior to publication in the Federal Register?: Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain: Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ANM-00-366-A

FAR/JAR 25.1331
INSTRUMENT USING A POWER SUPPLY

(Final Report)
(as agreed in AVHWG meeting #4 in Toulouse on Jan,13th 2000)

A. FAR 25.1331(a)(2)

1. What is the underlying safety issue addressed by FAR/JAR?
Assures that the instruments required under FAR/JAR 25.1303 are available to the flight crew in the event the power source that is supplied to each instrument is lost due to failure. In addition the JAR assures that a failure of one power source does not affect the same instrument on both pilot stations.

2. What are current FAR and JAR standards?

Current FAR 25,1331:
(a)(2) Each instrument must ,in the event of the failure of one power source, be supplied by another power source. This may be accomplished automatically or by manual means.

Current JAR 25.1331:
(a)(2) Each instrument must ,in the event of the failure of one power source, be supplied by another power source. This may be accomplished automatically or by manual means. The failure of one power source must not affect the instruments of both pilot stations

3. What are the differences in the standards?
(a)(2). The JAR requires in addition the failure of one power source must not affect the same instrument of both pilot stations.

4. What, if any, are the differences in required means of compliance?
N/A for this paragraph

5. What is the proposed action?
Envelope on the JAR but include clarification for the same instrument.

6. What should the harmonized standard be?
(a)(2) Each instrument must ,in the event of the failure of one power source, be supplied by another power source. This may be accomplished automatically or by

manual means. The failure of one power source must not affect the same instrument of both pilot stations.

7. How does this proposed standard address the underlying safety issue (identified in #1)?

No change in addressing the safety issue, see #1 above.

8. Relative to current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?

The proposed standard may increase the level of safety by clarifying the requirement that the same type of instrument can not be affected on both pilot stations.

9. Relative to current industry practice, does the proposed standard increase, decrease, or maintains the same level of safety?

Maintains the same level of safety.

10. What other options have been considered and why were they not selected?

The FAR words were considered but not retained because the JAR supersedes FAR rule.

11. Who would be affected by the proposed change?

None because compliance with 25.1309 and the current practices comply with the JAR.

12. To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) need to be included in the rule text or preamble?

None.

13. Is existing FAA advisory material adequate?

N/A.

14. If not, what advisory material should be adopted?

None.

15. How does the proposed standard affect the current ICAO standard?

The AVHWG is not aware of any..

16. How does the proposed standard affect other HWG's?

None affected.

17. What is the cost impact of complying with the proposed standard?

None.

18. **Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?**
Yes.

19. In light of the information provided in this report, does the HWG consider that the "fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the "Fast Track" process?
This project is appropriate for the "Fast Track" process.

B. FAR 25.1331(a)(3)

1 What is the underlying safety issue addressed by FAR/JAR?

Prevents the crew from using bad information by giving a visual warning when the data presented by an instrument to the crew becomes corrupted or lost.

2 What are current FAR and JAR standards?

Current FAR 25.1331:

(a)(3) If an instrument presenting navigation data receives information from sources external to that instrument and loss of that information would render the presented data unreliable, the instrument must incorporate a visual means to warn the crew, when such loss of information occurs, that the presented data should not be relied upon.

Current JAR 25.1331:

(a)(3) If an instrument presenting flight and/or navigation data receives information from sources external to that instrument and loss of that information would render the presented data unreliable, a clear and unambiguous visual warning must be given to the crew when such loss of information occurs that the presented data should not be relied upon.(see ACJ 25.1331 (a)(3)).

3 What are the differences in the standards?

(a)(3) The JAR deals also with flight data and The FAR requires the instrument must incorporate a visual means while the JAR requires a clear and unambiguous warning .

4 What, if any, are the differences in required means of compliance?

There is not an AC but it shall be noted that the corresponding ACJ 25.1331(a)(3) allows, where practicable, incorporation of the warning in the instrument.

5 What is the proposed action?

Envelope on the FAR and the JAR:

- consider Flight data in addition to navigation data as stated by the JAR
- take into account the need for incorporation in the instrument of a visual means to warn the crew as stated by the FAR and make it clear and unambiguous as stated by the JAR.

6 What should the harmonized standard be?

(a)(3) If an instrument presenting flight and/or navigation data receives information from sources external to that instrument and loss of that information would render the presented data unreliable, a clear and unambiguous visual warning must be given to the crew, when such loss of information occurs, that the presented data should not be relied upon. The warning shall be incorporated in the instrument.

7. How does this proposed standard address the underlying safety issue (identified in #1)?

Same as stated on #1 above.

8. Relative to current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?

Maintains the same level of safety.

9. Relative to current industry practice, does the proposed standard increase, decrease, or maintains the same level of safety?

Maintains the same level of safety.

10. What other options have been considered and why were they not selected?

None

11. Who would be affected by the proposed change?

None

12. To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) need to be included in the rule text or preamble?

None because the new harmonized code itself includes the ACJ 25 1331(a)(3) which recommended incorporation of a visual means in the instrument to warn the crew.

13. Is existing FAA advisory material adequate?

N/A - there is no FAA advisory material.

14. If not, what advisory material should be adopted?

N/A

15. How does the proposed standard affect the current ICAO standard?

The AVHWG is not aware of any.

16. How does the proposed standard affect other HWG's?

None affected.

17. What is the cost impact of complying with the proposed standard?

None if the system complies with the current requirements.

18. Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?

Yes.

19. In light of the information provided in this report, does the HWG consider that the "fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the "Fast Track" process?

This project is appropriate for the "Fast Track" process.

FAR/JAR 25.1423 Public Address System
(FINAL REPORT)

A. FAR 25.1423 (b)

1. **What is the underlying safety issue addressed by FAR/JAR?**
Assures system's operational availability within specified time for passenger announcements in the event of an emergency situation.

2. **What are current FAR and JAR standards?**
FAR 25.1423 (b):
Be capable of operation within 10 seconds by a flight attendant at those stations in the passenger compartment from which the system is accessible.

JAR 25.1423 (b):
The system must be capable of operation within 3 seconds from the time a microphone is removed from its stowage by a flight attendant at those stations in the passenger compartment from which its use is accessible.

3. **What are the differences in the standards?**
The JAR requirement is very specific in that the system must be operational within 3 seconds from the time the flight attendant removes the microphone from its stowage position. The FAR specifies that the system must be operational within 10 seconds. The FAR requirement does not specify the start of the 10-second time period.

4. **What, if any, are the differences in required means of compliance?**
Demonstration wise there is no difference. However, for a system to be approved under the JAR requirements it must operate within the 3 seconds from the time the microphone is removed from its stowed position. Conversely, the system can be approved under the FAR requirements if it is operational within 10 seconds by a flight attendant at those stations in the passenger compartment from which its use is accessible. Currently, the technology, which is used in the amplifiers for the public address system, is compliant with the 3 seconds delay requirement. The old vacuum tube technology needed heating and by consequence more time to operate. From now on, the 3 seconds delay is acceptable.

5. **What is the proposed action?**
The JAR requirement is more stringent, therefore, envelop on the JAR.

6. **What should the harmonized standard be?**
The system must be capable of operation within 3 seconds from the time a microphone is removed from its stowage by a flight attendant at those stations in the passenger compartment from which its use is accessible.

7. **How does this proposed standard address the underlying safety issue (identified in #1)?**

Same as Item #1 above.

8. **Relative to current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?**
The proposed standard maintains the level of safety. Clarifies the requirement.

9. **Relative to current industry practice, does the proposed standard increase, decrease, or maintains the same level of safety?**
For the systems that are designed to meet both the FAR/JAR requirements, the safety level remains the same. For the systems that were designed only to meet the FAR requirement, the safety level may be increased.

10. **What other options have been considered and why were they not selected?**
None.

11. **Who would be affected by the proposed change?**
Potentially some equipment manufacturers may be affected. For new equipment it is not a problem. Similar requirements exist in the FAR 121.318 and may need to be examined.

12. **To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) need to be included in the rule text or preamble?**
None.

13. **Is existing FAA advisory material adequate?**
Not applicable

14. **If not, what advisory material should be adopted?**

Not applicable

15. **How does the proposed standard affect the current ICAO standard?**
The AVHWG is not aware of any existing ICAO standards.

16. **How does the proposed standard affect other HWG's?**
No effect.

17. **What is the cost impact of complying with the proposed standard?**
None.

18. **Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?**
No.

19. In light of the information provided in this report, does the HWG consider that the "fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the "Fast Track" process?

The project can be worked under the "Fast Track" process.